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# Medical Students' Child Health Experience in Primary Schools: "The Best Day of Her Life"

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**Abstract**

This study was designed to explore medical students' and primary school teachers' experiences of a new community teaching project. Academic staff and students from the School of Medicine Dundee, National Health Service partners, local education department, and primary school teachers engaged in a collaborative project which has embedded community engagement in the curriculum while encouraging interprofessional education through multiagency working. Influenced by evaluative inquiry, this qualitative study used an online questionnaire, designed to give participants the freedom to respond, and give their own opinions, via free text responses. The results show the value of a real primary school–based situation, and the merit of experiential learning gained throughout the program, in which students interacted with children about health promotion in a meaningful way. The interprofessional and collaborative nature of the project enhanced the value of the experience for all participants in relation to the benefits of teamwork, dispelling the doctor authority and recognition of the roles of others. The experience was an interactive, enjoyable, and expressive way to facilitate learning, and has helped prepare the health care students for future practice.

**Keywords**

schools, education, social sciences, teaching, students, medicine, medical sociology, sociology

## Introduction

Interprofessional education (IPE) for health professionals and multiagency working has been moving up the political and professional agenda. Over the past 10 years, IPE has become an integral part of many health and social care professional programs throughout the United Kingdom. The reason for the growth in IPE activity is the requirement for health and social care graduates to be competent regarding interprofessional collaboration and team working in a variety of settings.

Through an evaluative inquiry approach, this article reports on the way in which academic staff and students from the School of Medicine Dundee, United Kingdom; National Health Service (NHS) partners; local education department, and primary school teachers engaged in a collaborative project which has embedded community engagement in the curriculum while encouraging IPE through multiagency working.

The School of Medicine offers a 5-year medical degree program and delivers an integrated, systematic course where contributions come from a range of specialties and community-based teaching. The General Medical Council (2015) sets out the outcomes for graduates. Students are expected to be able to teach, reflect, communicate, work, and collaborate with other members of the multidisciplinary team, in addition to respecting the values and beliefs of others.

The project began as a pilot in 2008 for medical and nursing students and was designed to achieve a number of specific goals. These include the enhancement of health care undergraduate professionals' experience of collaboration and team working, to introduce them to the concept of multiagency working, to work with young children and so gain a practical understanding of childhood growth and development, to inform their own skills as a teacher, and to enable young children to gain knowledge about key aspects of human health in a fun and interactive manner. The pilot project was introduced to five local primary schools. Working in pairs, medical and nursing students developed and delivered

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lessons across six afternoons to Primary 1 to Primary 7 pupils aged 4 to 11 years.

The pilot enabled self-selected undergraduate health care students to work collaboratively while deepening their learning, developing their professional attributes, and the knowledge and skills to become competent teachers.

While this innovative program meets some of the explicit requirements of the General Medical Council Tomorrow's Doctors 2009 (General Medical Council, 2015), it also fulfills some of the Scottish Government's policy toward Curriculum for Excellence (Her Majesty's Inspectorate of Education, 2009) and the Determined to Succeed Strategy (Scotland. Review Group on Education for Work and Enterprise., & Scotland. Scottish Executive, 2002)

Due to its continued success, the pilot was the catalyst for embedding the experience into the core medical curriculum. A new community teaching experience, known as "The Child Health Experience in Primary Schools" for all Year 2 medical students ($n$ = 176), was designed and implemented in 2014. It was delivered as a 4-week workshop within 16 local primary schools for pupils aged 4 to 6 years. The project was planned with academic staff and students, NHS staff (NHS Education for Scotland, 2011), employer engagement officers within the education department, and schoolteachers. There was ongoing discussion with the NHS consultant and specialist registrar in child health, and the child play therapist. All stakeholders were engaged in the project development and its delivery. With the emphasis on IPE, students and staff engaged in learning with, from, and about each other to generate mutual benefit while inspiring, informing, and educating the primary school pupils they taught.

Working in pairs, medical students delivered health education activities to school pupils under the guidance of a primary school teacher. The outcomes for both projects was to develop collaborative working while appraising the students' role as a teacher; develop their communication and play with the young child; develop their awareness of child health growth and development at an early stage in their career, while educating the young child about their body through play and interaction; and apply the skill of teaching to practice.

This encounter encourages multidisciplinary groups, to not only gain from each other's particular experience and professional approach but to respect different views and different perspectives in order to create something of great relevance to the community, as a whole, and not just the individuals involved.

This study is different in character from other studies as medical students are seldom given the opportunity to engage with children, who are not recipients of care within a health care framework or system, at an early stage in their career and within the community context, thus role modeling professional behaviors and providing an opportunity for a more diverse spectrum of children to encounter "health care" in the safety of their own classroom environment.

The projects provide the students with a real primary school–based situation in which to talk to children about health promotion in a meaningful way. It strengthens simulated teaching and practice-based learning by allowing the students to develop many skills in relation to this topic and communication skills related to this user group. The interprofessional and collaborative nature of the projects further enhance their value to the children, schoolteachers, and student participants in relation to the benefits of teamwork, dispelling the doctor authority and recognition of the roles of others. The experiences are an interactive, enjoyable, and expressive way in facilitating students', teachers', and school pupils' learning, and in helping prepare the health care students for their child health experience in future years.

This partnership has been ongoing since its inception, and the original project has continued to develop. There have been other collaborative developments. All participants are kept involved in the project through sharing of findings via local, national, and international channels including conference exhibits and workshops, poster presentations, local newspaper articles, educational research projects, university media, and web press sites.

## Method

### Aim

The aim was to provide medical students with a new opportunity to engage with children as part of a collaborative community experience.

### Design

Methodologically, this study has been influenced by evaluative inquiry (Preskill & Torres, 1999). The methodology was used to enhance learning in an organization, whereby the evaluating team's role was that of an informed facilitator, providing the structure for a process to evaluate the learning experience using dialogue, reflection, and challenge to distill learning opportunities, and to create a learning environment. Learning from evaluative inquiry is a social construction occurring through the involvement of different groups, each representing different perspectives. It is socially situated and is mediated through participants' knowledge and experiences. Evaluation culture is an accessible, teaching-orientated one that emphasizes the unity of formal evaluation and everyday thought.

Situated within the qualitative paradigm of research, through the collaboration of researchers and practitioners, the main data collected were through an online self-completed questionnaire which respondents filled in for themselves. It was designed to give all participants the freedom to respond and give their own opinions via free text responses (Thomas, 2010). This was efficient in terms of researchers' time and effort and enabled a greater depth of meaning to explore the participant's experience, values, beliefs, thoughts, and feelings.

The questionnaires consisted of five key statements and multiple substatements designed to ascertain the students' and teachers' experiences of the program. To gather data about knowledge, beliefs, attitudes, and behaviors, questionnaires were used to gather information that is unique to individuals. Participant groups (student, teacher, head teacher) were given questionnaires with similar questions. The questionnaire was adapted to reflect the individual group needs and offer insight into the impact of the context with free text answers to open questions. Discrete categories to exhaust the possible responses which respondents may wish to give were built into the questions (Cohen, Manion, & Morrison, 2007). The degree of responses, intensity of response, and the move away from dichotomous questions were managed by building in a degree of sensitivity and differentiation of response.

The questions within the questionnaire included the placement and the participants perception of the child health experience, how stimulating or interesting was the station, the value of the student engagement with the child, the value of the preparatory lectures/small group work sessions, what did they like best and least about the experience, suggestions for improvement, and the main learning taken from the experience for their future career.

Questionnaires were helpful in maintaining participants' privacy. The responses were anonymized; thus, confidentiality was maintained.

Project evaluation and feedback from staff, students, and pupils through dialogue, discussions around the activities, and opportunities for reflection have also been collated from the start of the project. This dialogue allowed the researchers to "hear" how participants perceived and experienced these practices.

## Participants

The Medical School delivers a 5-year integrated systematic degree course. The program follows the structure of the spiral curriculum (Bruner, 1977; Harden, 1999) revisiting domains of competence throughout the 5-year program. Approximately 165 students are admitted to the medical degree program each year.

A total of 176 Year 2 medical students, 19 primary school teachers, and seven primary school head teachers were invited to participate in the study, of which 163 students, 19 teachers, and seven head teachers took part. All participants provided consent at the beginning of the study period and were advised that they could remove themselves from the study at any time without any prejudice to them.

As evidence of their teaching contribution and demonstration of meeting the standards set within Good Medical Practice (General Medical Council, 2013) and Tomorrow's Doctors: Recommendations on Undergraduate Medical Education students (General Medical Council, 2015), students received a teaching certificate to include within their e-portfolio.

## Ethics Procedure

Dundee University Ethics Committee confirmed that the project was carried out according to the ethical standards upheld by the University of Dundee. Ethical considerations, as defined in the British Educational Research Association Guidelines (British Educational Research Association, 2011), were applied throughout the research.

Anonymity and confidentiality assurances were given so that the rights of the individuals were not compromised. Participants were given introductory information via email and within the online questionnaire site with the details of the study, why the study was being carried out, and the format of the questionnaire. They were given the opportunity to decline participation in the study at any time.

A pilot study was conducted with two members of staff who would not be participating in the main study.

## Analysis

Online data were downloaded as a spreadsheet and codes added to each respondent's questionnaire, in turn. The data were checked for accuracy by a second researcher, a senior academic. The data were then analyzed using an analytical process which involves a number of interconnected stages to classify and organize data according to key themes, concepts, and emergent categories as they relate to the research question. Internal validity was assessed in various ways including reflexivity, triangulation, and peer judgment (Creswell & Miller, 2000). Triangulation and data validation were informed by the level of consensus of the groups and convergence among the different sources of information to form the themes in the study.

## Introduction to Teaching

Academic staff and schoolteachers delivered preparatory sessions, for the students in Week 1, via lectures within the Medical School and small group–facilitated sessions within the community. In Week 2, students prepared their lessons. During Weeks 3 and 4, the students delivered the teaching to the primary school pupils.

Six stations, with two students per station, were arranged at the schools. Themes for the activities or stations are based on the "Teddy Bear Hospital" (European Medical Students Association, 2005). These include Oral health, It's an emergency/people who help us, Broken bones and Bandaging Station, What-a-Doctor-Uses/Medication, Teddy Surgery, and What's inside my body. Students are encouraged to be creative in developing the sessions with the aim of reducing the anxiety children experience of doctors and the hospital environment through fun, and within a safe learning environment. The Curriculum for Excellence learning intention and success criteria (Learning and Teaching Scotland, 2009) were also communicated, and included good lifestyle habits, such

as healthy eating, the value of exercise, and encouraging children to be healthy and to learn more about the human body. The aim is to supplement the experiences of children and young people aged 3 to 18 years throughout their education.

Resources are shared between the school of medicine and nursing, dental hospital, the education department, and primary school, for example, clinical skills equipment, toothbrushes, teddy bears with anatomical parts, and the student's own creative resources.

## Results

The findings reported here are based on the data collated. Where similarities in participant responses occurred, the results from the three participant groups, medical students, primary school teachers, and head teachers, have been combined, as illustrated below. The main themes identified are as follows: the value of the experience, teaching skill development, communication, overcoming challenges, preparatory session, future opportunities, career progression, and teacher/pupil observation.

### *The Value of the Experience*

The value of the experience was the main recurring theme for all participant groups. Medical students described the experience as developing insight of the skills required for teaching in future practice; it enriched their medical curriculum; it was "novel" and original in its design while being different from traditional teaching; students took pride in being role models for young children, and they were keen to have a positive impact on the child and the communities that they were entering; and the interactive nature of the sessions was beneficial to all children and, in particular, to those children with special needs.

Students and teachers reported that the children engaged with the activities and enjoyed the sessions; the children appeared keen to build on previous learning and relayed this to their teachers, demonstrating a sense of pride. The schoolteachers and head teachers expressed gratitude toward the students and requested further student teaching opportunities and involvement in the schools; medical students discussed the importance of being part of the community and having the opportunity to give back to the community from an early point in their careers.

> We tried to make the station as interactive as possible. We used a teddy to show the "organs" of the body, I made a fake bottle of blood to show how much blood goes through the heart . . . a piece of string to show the length of the intestines . . . a tennis ball and tights to demonstrate "peristalsis" and a balloon to demonstrate air flowing from the lungs, as well as visual diagrams. I think this extra effort was definitely worthwhile because the children were able to take a "hands on" approach to the station to aid their learning. (Student 121)

> Thank you to all of the students for their hard work, enthusiasm and positive engagement with the class. (Teacher 2)

> The children absolutely loved it. The Students were very good with the children. The rest of P1 can't wait for their return. (Head Teacher 4)

### *Teaching Skill Development*

The experience helped the students develop their skill of teaching while learning from the "experts" and recognize the importance of applying various teaching techniques for their future role as a teacher. Students spent time and effort creating and developing their lesson plans. This generated a sense of self-achievement and fulfillment.

> [The most valuable thing that I will take into my future career/course] . . . we have a role to educate as well. (Student 157)

> Great experience overall . . . gave students hands on experience with primary children. (Teacher 7)

> The pupils had a wonderful time, lots of very well Teddies now! Thank you for thinking of us! (Head Teacher 1)

### *Communication*

Communicating with young people in the appropriate context and at the developmental stage of the child, simplifying concepts and long words, and the interactive nature of the stations were raised as "important points" by students and teachers.

> It was so lovely to see the children so happy and a really good fun way of improving communication skills. It was so rewarding when the children spoke about how much they enjoyed our teaching and even one child described it as "the best day of her life." (Student 143)

> I thought the medical students tried very hard to engage the children and gave the children positive feedback. (Teacher 10)

> It was brilliant—great feedback from staff and children. Many thanks. (Head Teacher 3)

### *Overcoming Challenges*

During the teaching sessions, the medical students faced some challenges and developed a range of teaching strategies to overcome this. For example, they kept the children's attention by adopting problem-solving techniques to their teaching by adapting their stations; they asked about [the child's] personal experiences, for example, a relative who had a broken bone; they gave rewards in the form of stickers as a technique to reinforce good behavior. These techniques helped the child interact more with the station. The children brought

their past experiences to the discussion which, in turn, helped other pupils who were less familiar with health and well-being.

> This experience has helped me appreciate the importance of flexibility within teaching. As a teacher, of any age group, you must be able to adapt your teaching style to fit your audience . . . accept when a concept is too difficult and have the adequate experience to change your method of teaching. Finally, you must have the skills to deliver your learning points in an enthusiastic and interesting way . . . I now realise that learning is achieved much more effectively by a captivated audience. (Student 96)

> A number of the students interacted very well with the children. They used terms the children could understand and they had visuals/props to demonstrate—young children respond well to this and the students are to be commended for this. (Teacher 8)

### *Preparatory Sessions*

Students indicated that the preparatory sessions, delivered by the university, helped them understand the project objectives which in turn supported the development of their lesson plan. This set the experience in context for the students and knowing the relevance of the teaching gave the students an opportunity to develop as adult learners; thus highlighting the contribution of the multidisciplinary team involved in the project.

> I liked the strong positive attitude from everyone about the crosslinking between Medicine and Education and the real shared belief that what we were doing made a difference to everyone on both sides. (Student 11)

> As a passionate teacher, I very much enjoyed talking about my craft and equipping the students for working with young children. (Teacher 14)

### *The Future*

There was a willingness from the students, teachers, and head teachers to develop the project in the future. Students suggested teaching older groups of children to see the child's developmental progression while strengthening their communication and teaching skills.

> Have the first teaching session aimed at young kids, e.g., P1 and the second session aimed at older kids, e.g., P7. The communication skills needed to interact with each age group respectively is also different [and] useful for us as students . . . (Student 52)

> We would certainly like to be considered for visits in future years. This was an excellent activity with enormous educational and living skills benefits. (Teacher 16)

> The children absolutely loved it. The Students were very good with the children. The rest of P1 can't wait for their return. (Head Teacher 4)

### *Career Progression*

The child health experience informed students about the opportunities which exist for working with children in future years: as a specialist in the field of pediatrics, emergency medicine, an academic career, and an intercalated teaching in medicine degree program.

> It has inspired me to pursue a career in paediatrics. (Student 121)

### *Teacher/Pupil Observation*

Teachers' relished the opportunity to observe their pupils interacting with others, seeing how each child adapted to new situations, information, and challenges.

> I was given the opportunity to observe my class, something we are rarely afforded the luxury of doing since we have no visiting specialist staff anymore and there are not many external agencies who offer opportunities to children of primary one age. I could see how they interacted with other adults. I got the chance to watch how carefully they listened, how well they how confident they were in asking their own questions. (Teacher 8)

## Discussion

Literature supports the need for health and medical professionals to develop the skills and practices of a competent mentor and teacher for lifelong learning (Dandavino, Snell, & Wiseman, 2007; General Medical Council, 2015). While this may be the case, it is, at times, questioned whether students receive adequate opportunities to develop as teachers. This project was innovative in its approach to solving this concern. The value students' placed on opportunities to develop their teaching skills was evident by their appreciation of the experience as educators now and in the future. Learning about teaching early in one's career can help students to have confidence in their abilities and thus a stronger teacher identity they can understand how they themselves learn.

Communication skills development was a major theme emerging from the data. More specifically, students discussed developing teaching skills and communicating in a different way from their past experiences. Communication and teaching skill development, on the placement served, improved the students' confidence in their teaching role and for future practice. Improved confidence and satisfaction from teaching/communicating effectively is likely to benefit their future teaching and ultimately enhance the comfort of patients while improving learning of their future mentees (Crowe, Harris, & Ham, 2000). Teaching improves communication skills and

the ability to explain concepts such as diseases or treatment in a person-friendly manner (Prozesky, 2000). Within this study, medical students' acknowledged that simplifying words and concepts was one of the challenges they sought to overcome. Working out how to deliver the information at the right level for their audience, the students learned valuable and transferable skills (Launer, 2009).

The project was mutually beneficial for both the students and the primary schools involved, thus maximizing partnership and contribution to the wider community (Dundee City Council, 2012; Her Majesty's Inspectorate of Education, 2009; Scottish Government, 2012), while drawing upon specialist expertise. Children were provided with novel and interactive insight into health care by students with specialist knowledge. Given the significance of policy documents, it would seem that education providers can play a leading role in implementing policies for lifelong learning (General Medical Council, 2015; Nursing and Midwifery Council, 2008).

Students, teachers, and head teachers viewed the experience extremely positively, and the majority expressed a desire to continue with the project in the future. This study has demonstrated the feasibility of embedding practical teaching for students into the curriculum. Student data implied that multiagency working was clearly valued. Working outside the hospital environment and contributing to the community in a meaningful way was repeated by the all participant groups.

Goodhall (2012) suggests community participation, communication skills, increased understanding and an appreciation of nonmedical health support infrastructure in local communities is valued by students across the globe. The authors believe the work undertaken by the Dundee project, further supports that developing working partnerships with the community has value and meaning for the future.

Although evidence around peer education among students exist, there would appear to be few opportunities for students to actively engage in teaching (Alcolado & Alcolado, 2011; Muir, McTaggart, & Bradey, 2011). Unlike this study whereby teaching is embedded into the curriculum, ensuring that every student has an experience of teaching during his or her preclinical years, it appears to be an "opt in" component of the course. Many students may never be exposed to the "doctor as teacher" role (Amorosa, Mellman, & Graham, 2011).

The majority of students in this study overcame a series of "challenges" by creative and problem-solving strategies and positive reinforcement which correlates with teaching strategies embedded deeply within a pedagogical approach to education (Isaksen, Stead-Dorval, & Treffinger, 2011; Sigler & Aamidor, 2005). Students enhanced their learning, and their pupils' learning, through the experience by enabling the more knowledgeable pupils help others to learn (Kaufman, 2003; Vygotskii & Cole, 1978). Although students used various teaching strategies, they were unaware of their significance for learning.

Although there is an expectation for medical students to be adult learners, they are not always treated as such (Goldman, 2009). There was some uncertainty around lesson planning, and few students expressed a need for more guidance. Adult learning theory supports the view that adults should take responsibility for, and be able to self-direct, their learning (Knowles, 2011). The significance of setting the teaching in context, allowing students to see its relevance during the preparatory sessions, and giving them the opportunity to apply themselves to the task creatively seeks to eliminate this problem.

The integrated nature of the spiral curriculum allows students to apply what they have learned in their preclinical years to their studies in later years (Harden, 1999). Students valued exploring future teaching opportunities (Muir, 2014). A notable number also discussed the relevance of the task in relation to pursuing careers in primary health care, pediatrics, and emergency medicine. The teaching experience was viewed as an innovative and novel way of developing students' skills. Many of the students valued the originality of the experience and enjoyed the variety that it brought to their course. Teachers' acknowledged the value of being able to "stand back" and observe their pupils interacting with others.

Compared with previous work, this qualitative methodological approach added value in that it facilitated a rich exploration of students', teachers' and head teachers' experience of developing community partnerships and experiences for students. By building bridges of understanding between the university and community, and involving students from the start of their studies, it may be feasible to reduce the gap so that a genuine understanding of others' perspectives and efforts is achieved (Whealthall, Graham, & Turn, 1998).

The only theme identified for change, and one which would enhance the process, was more communication between the university and the schools regarding the practical setup of the teaching sessions. This will be addressed in the next delivery of the program.

### *Limitations of the Study*

The study was intended to explore and gain an understanding of the project in its complexity and its entirety, as well as its context, and provide a rich description so that readers can see whether the study is applicable to their situation or not. It may in turn become a tentative hypothesis for further research (Burns, 2000).

## Future Considerations

The ultimate aim of this report was to describe learning from an evaluative inquiry and the outcomes to improve the student's understanding of the child, at an early stage in their career, while educating the young child about their body through play and interaction. The project is an interactive and fun way to facilitate students', teachers', and school pupils' learning, and to help prepare the medical students for

their child health experience in later years. The results from the project evaluation, and the dedication and ongoing commitment from staff and students, have enabled further curriculum development with local secondary schools and for the students studying the BMSc Teaching in Medicine intercalated degree (Muir & Law, 2014).

Both external (education department and primary schools) and internal (School of Medicine and the NHS) partnerships have been created as a result of the project. The project has benefitted all partners in meeting several other policies including Interprofessional Learning IPL agenda (Centre for the Advancement of Inter-Professional Learning, 2014), Partnerships for Learning Education (Education Scotland, 2012), and Transforming Lives Through Learning (Education Scotland, 2013). It supports the Medical School curricula, and the needs of the primary schools and education department.

Through effective collaboration, the University and Education Department have demonstrated, in a very tangible way, the importance both institutions place on real and practical public engagement. In addition, the benefits to the community, as a whole, are also significant as the children at the schools not only enjoy their learning but also take some of the lessons around healthy lifestyle home to their own families. They become partners in the process of potentially bringing about a cultural shift around the importance of health promotion and having a healthy lifestyle, something which is greatly needed in a city with real challenges around the negative impression of deprivation and poverty on its population health.

This collaborative project embeds community engagement within the undergraduate curriculum while encouraging IPE through multiagency working. The developments have been mutually amicable between all partners; there are no significant costs. This project continues to run each year, and a new Year 3 community school experience will be delivered this coming year. Future possibilities include extending the project to include student nurses, dental students, or other members of the health care team and an evaluation to look at the impact of programs on the different stakeholder groups.

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## References

Alcolado, R., & Alcolado, J. C. (2011). Medical student delivery of alcohol education to high school pupils: The MEDALC programme. *Clinical Medicine*, *11*, 443-447.

Amorosa, J. M., Mellman, L. A., & Graham, M. J. (2011). Medical students as teachers: How preclinical teaching opportunities can create an early awareness of the role of physician as teacher. *Medical Teacher*, *33*, 137-144. doi:10.3109/01421 59X.2010.531154

British Educational Research Association. (2011). *Ethical guidelines for educational research*. London, England: Author.

Bruner, J. S. (1977). *The process of education*. Cambridge, MA: Harvard University Press.

Burns, R. B. (2000). *Introduction to research methods* (4th ed.). London, England: Sage.

Centre for the Advancement of Inter-Professional Learning. (2014). *Principles of interprofessional education*. Retrieved from http://caipe.org.uk/resources/principles-of-interprofessional-education/

Cohen, L., Manion, L., & Morrison, K. (2007). *Research methods in education* (6th ed.). London, England: Routledge.

Creswell, J. W., & Miller, D. L. (2000). Determining validity in qualitative inquiry. *Theory Into Practice*, *39*, 124-130. doi:10.1207/S15430421tip3903_2

Crowe, P., Harris, P., & Ham, J. (2000). Teaching on the run: Teaching skills for surgical trainees. *Australian and New Zealand Journal of Surgery*, *70*, 227-230.

Dandavino, M., Snell, L., & Wiseman, J. (2007). Why medical students should learn how to teach. *Medical Teacher*, *29*, 558-565. doi:10.1080/01421590701477449

Dundee City Council. (2012). *The council plan 2012-2017*. Retrieved from http://www.dundeecity.gov.uk/dundeecity/uploaded_publications/publication_3481.pdf

Education Scotland. (2012). *Partnerships for learning education*. Retrieved from http://www.educationscotland.gov.uk/learningteachingandassessment/partnerships/

Education Scotland. (2013). *Transforming lives through learning corporate plan 2012-2016*. Retrieved from http://www.educationscotland.gov.uk/Images/ESCorporatePlan_tcm4-816614.pdf

European Medical Students Association. (2005). *Teddy Bear Hospital*. Retrieved from http://www.emsa-europe.eu/medical-education

General Medical Council (Great Britain). (2013). *Good medical practice*. Manchester: General Medical Council.

General Medical Council. (2015). *Outcomes for Graduates*. Retrieved from http://www.gmc-uk.org/education/undergraduate/undergrad_outcomes.asp

Goldman, S. (2009). The Educational Kanban: Promoting effective self-directed adult learning in medical education. *Academic Medicine*, *84*, 927-934. doi:10.1097/ACM.0b013e3181a8177b

Goodall, J. (2012). Beyond the ward and waiting room: A community-based non-clinical placement programme for Australian medical students. *Medical Teacher*, *34*, 1070-1074. doi:10.3109/0142159X.2012.719655

Harden, R. M. (1999). What is a spiral curriculum? *Medical Teacher*, *21*, 141-143. doi:10.1080/01421599979752

Her Majesty's Inspectorate of Education. (2009). *Learning together: Improving teaching, improving learning*. Livingstone, UK: Author.

Isaksen, S. G., Stead-Dorval, K. B., & Treffinger, D. J. (2011). *Creative approaches to problem solving: A framework for innovation and change* (3rd ed.). London, England: Sage.

Kaufman, D. M. (2003). Applying educational theory in practice. *British Medical Journal*, *326*, 213-216.

Knowles, M. S., Holton, E. F., & Swanson, R. A. (2011). *The adult learner: The definitive classic in adult education and human resource development* (7th ed.). Oxford: Butterworth-Heinemann.

Launer, J. (2009). From my diary. *Education for Primary Care*, *20*, 70-71.

Learning and Teaching Scotland. (2009). *Curriculum for excellence*. Retrieved from http://www.educationscotland.gov.uk/Images/all_experiences_outcomes_tcm4-539562.pdf

Muir, F., & Law, S. (2014). Students' perceptions and experiences of a new "Teaching in Medicine" BMSc intercalated degree programme. *Medical Teacher*, *36*, 403-408. doi:10.3109/0142159X.2014.889288

Muir, F., McTaggart, I., & Bradey, S. (2011). Developing collaborative work through teaching. *British Journal of School Nursing*, *6*, 230-232.

Muir, F., Scott, M., McConville, K., Watson, K., Behbehani, K., & Sukkar, F. (2014). Taking the learning beyond the individual: How reflection informs change in practice. *International Journal of Medical Education*, *5*, 24-30. doi:10.5116/ijme.52ec.d21f

NHS Education for Scotland. (2011). *Doctors in difficulty framework*. Retrieved from http://www.nes.scot.nhs.uk/education-and-training/by-discipline/medicine/about-medical-training/resources/publications/doctors-in-difficulty-framework.aspx

Nursing and Midwifery Council. (2008). *Standards to support learning and assessment in practice—NMC standards for mentors, practice teachers and teachers*. Retrieved from http://www.nmc-uk.org/Documents/Standards/nmcStandardstoSupportLearningAndAssessmentInPractice2008.pdf

Preskill, H., & Torres, R. (1999). *Evaluative inquiry for learning in organisations*. Thousand Oaks, CA: Sage.

Prozesky, D. R. (2000). Communication and effective teaching. *Community Eye Health*, *13*(35), 44-45.

Scotland. Review Group on Education for Work and Enterprise., & Scotland. Scottish Executive. (2002). *Determined to succeed: A review of enterprise in education*. Edinburgh: Scottish Executive.

Scottish Government. (2012). *Strategic guidance for community planning partnerships community learning and development*. Retrieved from http://www.nls.uk/scotgov/2012/9781780457758.pdf; http://www.scotland.gov.uk/Publications/2012/06/2208

Sigler, A., & Aamidor, S. (2005). From positive reinforcement to positive behaviours: An everyday guide for the practitioner. *Early Childhood Education Journal*, *32*, 249-253.

Thomas, P. (2010). *Research methodology and design*. Retrieved from http://uir.unisa.ac.za/bitstream/handle/10500/4245/05Chap4_Researchmethodologyanddesign.pdf

Vygotskii, L. S., & Cole, M. (1978). *Mind in society: The development of higher psychological processes*. Cambridge, MA: Harvard University Press.

Whealthall, S., Graham, J., & Turn, C. (1998). Maintaining and repairing the community-campus bridge—Five years' experience of community groups educating medical students. *Journal of Inter-Professional Development*, *12*, 289-301.

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